

# A preliminary clinico-epidemiological portrayal of COVID-19 pandemic at a premier medical institution of North India

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#### Abstract:

**CONTEXT:** The outbreak and spread of severe acute respiratory syndrome coronavirus 2 has led to a global exigency of colossal and monstrous proportions in terms of public health and economic crisis. Till date, no pharmaceutical agent is known to manage in terms of prevention and treatment of coronavirus disease 2019 (COVID-19), the disease caused by a novel virus.

**AIMS:** The aim of the present work was to understand the underlying disease profile and dynamics that could provide relevant inputs and insight into pathophysiology and prevent further spread and evolve management strategies of COVID-19 patients from data-driven techniques.

**SETTINGS AND DESIGN:** A retrospective observational descriptive study was conducted on 29 COVID-19 patients admitted at a premier medical institution of North India in the months of February and March 2020.

**METHODS:** The patients were diagnosed with reverse transcription-polymerase chain reaction test. Demographic, clinical, and laboratory data were collected.

**RESULTS:** The mean age of population was 38.8 years with male preponderance, of which two patients were residents of Italy, and others hailed from semi-arid and Western sandy arid regions of Rajasthan (urban population). The major presenting symptom complex of said COVID-19 sample population included fever (48%), cough (31%), and shortness of breath (17%). Most of the patients (83%) had no comorbidity. No clinical correlation ( $r$ ) could be appreciated between the duration of test positivity and age of afflicted COVID-19 patients ( $r = -0.0976$ ).

**CONCLUSIONS:** The present evaluation of various facets of the ongoing global pandemic of COVID-19 is an attempt to portray early clinical and epidemiological parameters of the menace of COVID-19 patients admitted at SMS Medical College and Attached Hospitals, Jaipur.

#### Keywords:

Clinical and epidemiological parameters, COVID-19, pandemic, severe acute respiratory syndrome coronavirus 2

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The World Health Organization (WHO), on receiving alerts from China (relating

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to cluster pneumonia cases classified as COVID-19 from Wuhan, China), declared coronavirus disease 2019 (COVID-19) as Public Health Emergency of International

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Concern leading to a state of pandemic.<sup>[1]</sup> COVID-19, recently evolved respiratory disease of potential virulence, is caused by novel severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) that has come to acquire the status of an enormous global pandemic, where survival of humankind is at stake. The clinical spectra of COVID-19 is varied, ranging from mild-to-moderate symptoms of cough, sore throat, headache, rhinorrhea, vomiting, diarrhea, fever, and shortness of breath to signs, and symptoms complex of severe pneumonia, acute respiratory distress syndrome, septic shock, and/or multiple organ failure.<sup>[2]</sup>

The COVID-19 pandemic made its presence felt in the province of Wuhan, China, with characteristic epidemiological and clinical parameters relating to age (mean age being 56 years) and male preponderance relating increased mortality with hypertension, diabetes, coronary heart disease, chronic obstructive lung disease, and other comorbid conditions.<sup>[2]</sup>

Human coronaviruses were first discovered way back in the 1960s, and their name corona represents crown-like spikes that are seen on these viruses on electron microscopy.<sup>[3]</sup> Coronaviruses, zoonotic in nature that seem to have originated through bats with intermediary of pangolin and/or snakes, are a large family of viruses that affects mainly the airway resulting in a range of symptoms from common cold to that of severe illness resulting in the fatality of the order of 2.0% so reported.<sup>[4]</sup> Considering the abstruse and potential virulence of SARS-CoV-2, the present article is an attempt to portray epidemiological and clinical correlates of COVID-19 in an endeavor to appreciate disease dynamics in the Indian population.

## Methods

SMS Medical College and Attached Hospitals, Jaipur, a premier tertiary care teaching hospital of Rajasthan, has been designated for isolation and management of COVID-19 patients as per Government dictum. The current research design is a retrospective observational descriptive study of the first 29 COVID-19 patients who were confirmed as being infected with SARS-CoV-2 through reverse transcription-polymerase chain reaction (RT-PCR) techniques. The center has implemented preventive measures and management services as per guidelines issued by the Ministry of Health and Family Welfare and Indian Council of Medical Research, New Delhi. The hospital staff taking all precautionary measures has been involved in the management of COVID-19 patients. Individuals who met the criterion of a suspected case, defined as “symptomatic patient with travel history to countries with COVID-19 patients over the previous last 14 days,

or who had exposed themselves to COVID-19 positive patients in the community,” were admitted in the hospital. The nasopharyngeal and oropharyngeal swabs were tested at laboratory of microbiology of the institute using RT-PCR for the confirmation of SARS-CoV-2 infection. All laboratory confirmed cases have been included in the present study. Furthermore, the epidemiological, clinical, laboratory, and hospital data were recorded.

## Statistical analysis

A hospital-based descriptive study was conducted in the SMS Medical College and Attached Hospitals, Jaipur. Twenty-nine patients of COVID-19 were enrolled to find early epidemiologic trends. The quantitative variables were defined with mean and standard deviation (SD), whereas qualitative measures were defined as proportions. The correlation between quantitative variables was performed. Statistical significance for Pearson’s correlation coefficient was tested with Student’s *t*-test, and for qualitative variables, Statistical significance was tested with the Chi-square test at 5% level of significance. The software used was JASP (JASP (Version 0.12.2) University of Amsterdam, Netherlands. Copyright 2013-19.).

## Results

Twenty--nine patients were included in the present study over a period ranging from February 29, 2020 to March 31, 2020. The demographic profile inclusive of age, gender, and nationality is depicted in Table 1. The mean age of sample population was 38.8 years (with an SD – 18.9 years), with a male preponderance of male gender (69%) as had been observed in Wuhan, China, COVID-19 outbreak.<sup>[2]</sup> Most of the patients were Indians (93%), leaving aside an elderly married couple who came visiting India from Italy. Moreover, three patients had a recent overseas travel history. The number of patients coming from semi-arid regions of Alwar, Jaipur, Ajmer, and Bhilwara were one, twelve, five, and three, respectively, and five were from Jhunjhunu and one from Churu, the geographical belt that makes the Western sandy arid region of Rajasthan. It is depicted in the map of Rajasthan [Figure 1].

**Table 1: Demographic profile**

Attributes	Level	Frequency	Total	Proportion	$\chi^2$	<i>P</i>
Age group	15-40	18	29	0.62	12.07	0.00
	40-60	8	29	0.28		
	Above 60	3	29	0.10		
Sex	Female	9	29	0.31	4.17	0.04
	Male	20	29	0.69		
Nationality	Foreign	2	29	0.07	21.55	<0.001
	Indian	27	29	0.93		

Demographic profile of early COVID-19 patients (*n*=29). There are significant differences in the distribution of COVID-19 patients within age, gender, and nationality

The mean duration of RT-PCR conversion from positive to negative test profile was 8.8 days (with an SD of 3.5 days). The clinical and laboratory profile are summarized in Table 2. More than half of the patients are symptomatic (62%), with most common presenting symptoms in the order of frequency being fever (observed in 48% COVID-19 patients), cough (31%), shortness of breath (17%), headache (10%), rhinorrhea (7%), sore throat (3%), vomiting (3%), and diarrhea (3%), respectively.

Five patients (17%) of the sample population had coexisting comorbidities that included hypertension (two patients), acute myocardial infarction, diabetes mellitus type 2, and chronic obstructive pulmonary disease [Table 2].

The strength of association between age and duration of positivity in the selected patient population is not clinically as well as statistically significant ( $r = -0.0976$ ; 95% confidence interval:  $-0.59, 0.45$ ) ( $P = 0.74$ ).

Table 1 represents demographic profile of early COVID-19 patients ( $n = 29$ ). There are significant differences in the distribution of COVID-19 patients within age, gender, and nationality.

Table 2 represents a clinical profile of early COVID-19 patients. There are significant differences in the distribution of COVID-19 patients within most symptoms and comorbidities.

## Discussion

The current set of clinical and epidemiological characteristics of 29 patients have exhibited varied pattern in the tropical area of North India that could give potential insight in prevention and management of such COVID-19 patients and give a platform to evolve public health strategies to flatten the uprising upstroke of the epidemic curve and decelerate the explosive splurge and surge, so characteristic of COVID-19 was observed in other parts of the globe.<sup>[5]</sup> It could be perceived that patients in the age range of 15–40 years, comprising 62% of the sample patient population, were maximally afflicted. This observation of an affliction of SARS-CoV-2 for young individuals<sup>[6]</sup> as compared to the findings of Wuhan, China, COVID-19 outbreak need further age standardization, as Hasan *et al.* in 2020 too had documented the propensity of SARS-CoV-2 to affect the adult population as compared that observed for pediatric cases.<sup>[7]</sup> However, in this context, it was also observed that patients below the age 50 years exhibited



Figure 1: Map of the Indian State of Rajasthan. Depicts the number of patients coming various regions of Rajasthan

**Table 2: Clinical profile**

Attributes	Level	Frequency	Total	Proportion	$\chi^2$	P	
Symptoms	Asymptomatic	Absent	18	29	0.62	1.69	0.19
		Present	11	29	0.38		
Fever	Absent	15	29	0.52	0.03	0.85	
	Present	14	29	0.48			
Cough	Absent	20	29	0.69	4.17	0.04	
	Present	9	29	0.31			
Shortness of breath	Absent	24	29	0.83	12.45	<0.001	
	Present	5	29	0.17			
Headache	Absent	26	29	0.90	18.24	<0.001	
	Present	3	29	0.10			
Rhinorrhea	Absent	27	29	0.93	21.55	<0.001	
	Present	2	29	0.07			
Sore throat	Absent	28	29	0.97	25.14	<0.001	
	Present	1	29	0.03			
Vomiting	Absent	28	29	0.97	25.13	<0.001	
	Present	1	29	0.03			
Diarrhea	Absent	28	29	0.97	25.13	<0.001	
	Present	1	29	0.03			
Comorbidity	Comorbidity	Absent	24	29	0.83	12.45	<0.001
		Present	5	29	0.17		
Hypertension	Absent	27	29	0.93	21.55	<0.001	
	Present	2	29	0.07			
Acute myocardial infarction	Absent	28	29	0.97	25.13	<0.001	
	Present	1	29	0.03			
Type 2 diabetes mellitus	Absent	27	29	0.93	21.55	<0.001	
	Present	2	29	0.07			
Chronic obstructive pulmonary disease	Absent	28	29	0.97	25.13	<0.001	
	Present	1	29	0.03			

Clinical profile of early COVID-19 patients. There are significant differences in the distribution of COVID-19 patients within most symptoms and comorbidities

a mean duration of around 9.8 days that were needed for RT-PCR test to become negative for SARS-CoV-2 infection, and it was observed that COVID-19 patients above 50 years of age recovered and became SARS-CoV-2 infection negative in around 12 days, although the coefficient of correlation was observed to be statistically insignificant ( $r = -0.0976$ ).

The COVID-19 patients exhibited a gender bias with preponderance for male patients who made up 69% of the patient population. In the present study, two patients were foreign tourists being residents of Italy (7%), supporting the premise of SARS-CoV-2 being a virus of foreign origin with a supposedly high infectivity, an observation that had been supported by Remuzzi and Remuzzi, who had observed that after China, the supposed epicenter and esoteric reality of COVID-19 pandemic, Italy is the particularly the most affected country.<sup>[8]</sup> Such an observation mandates an urgent need of public health services to track contacts of these and such foreigners and implement appropriate quarantine measures for suspects, accordingly.

The sign and symptom complex of sample COVID-19 patients had a characteristic pattern with more than half the patient population being symptomatic (62%). The percent of patients who presented with fever was 48%, cough was 31%, and 17% of patients had complaints of shortness of breath. Cia *et al.*<sup>[9]</sup> too had observed that most common symptoms occurred during the early days of outbreak in pediatric population at Wuhan and percent of patients suffering from fever was 80% (eight in number), from cough was 60% (six in number), from sore throat was 40% (four in number), from stuffy nose was 30% (three in number), and from sneezing and rhinorrhea was 30% (two in number). A similar sign and symptom complex across geographical locales of temperate region of Wuhan, China, and tropical area of India upholds further the premise that such an array of sign and symptoms template could act as a complaint first public screening measure and tool to assay suspects with SARS-CoV-2 infection.

Considering the H1N1 pandemic phases as per the WHO guidelines, the virus seems to be in Phase 2 in

India that could very change its course to Phase 3 if adequate, and SARS-CoV-2 complaint measures are not adopted to contain the spread of such an infective pandemic.<sup>[10]</sup> The containment of the spread is the most effective measure that has the potential to reduce the virulence and morbidity of COVID-19 pandemic. Predominantly, public health measures are required to flatten the epidemic curve, so the morbidity load is below the resident region-specific hospital capacity.

## Conclusions

The present evaluation of various facets of ongoing global pandemic of COVID-19 is an attempt to portray early clinical and epidemiological parameters of the menace of COVID-19 patients admitted at SMS Medical College and Attached Hospitals, Jaipur, and renders invaluable insight on available preventive measures in present times that could substantially help in containing the spread of SARS-CoV-2 infection along the precincts of the nation and across the globe. Moreover, such an endeavor could give the desired inputs in framing public health strategies that would ensure the flattening of the perilously uprising of the pandemic curve, which happens to question the very survival of humankind.

## Limitation of the study

Due to the initial outbreak of COVID-19 pandemic in India and subsequent small sample population size, no inferences could be drawn through salient observations, and consequent trending could be appreciated through data mining.

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## Conflicts of interest

There are no conflicts of interest.

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